

1           1. A circuit comprising:  
2           a converter circuit including first and second input terminals, a rectifier circuit  
3           coupled to the first and second input terminals, a resonant inductor, a resonant capacitor,  
4           first and second voltage rails, and at least first and second load terminals to energize a  
5           load;  
6           first and second clamping devices coupled so as to provide a circuit path between  
7           the first and second voltage rails; and  
8           a first series capacitor having a first terminal coupled to a point between the first  
9           and second clamping devices and a second terminal coupled to the first input terminal to  
10          provide a feedback path for a feedback current such that a load current has a signal  
11          envelope substantially tracking an input voltage signal on the first and second input  
12          terminals.

1          2. The circuit according to claim 1, further including a feedback current adjusting  
2          component coupled across a first one of the first and second clamping devices.

1          3. The circuit according to claim 1, further including at least one storage capacitor  
2          coupled to the first and/or second voltage rails.

1          4. The circuit according to claim 3, wherein a load current splits at the point between the  
2          first and second clamping devices into a first clamp current to the first clamping device, a  
3          second clamp current to the second clamping device, and a feedback current to the series  
4          capacitor.

1          5. The circuit according to claim 4, further including at least one feedback current  
2          adjusting component coupled across a first one of the first and second clamping devices  
3          such that the load current further splits into a current to the feedback current adjusting  
4          component.

- 1 6. The circuit according to claim 5, wherein the feedback current adjusting component  
2 includes a capacitor.
- 1 7. The circuit according to claim 1, wherein the first and second clamping devices  
2 include diodes.
- 1 8. The circuit according to claim 1, wherein the rectifier circuit includes a voltage  
2 doubling configuration having first and second diodes coupled end-to-end across the first  
3 and second voltage rails.
- 1 9. The circuit according to claim 1, wherein the rectifier circuit includes a full-wave  
2 rectifying circuit and the circuit further includes a second series capacitor to provide a  
3 further feedback path from the point between the first and second clamping devices.
- 1 10. The circuit according to claim 9, further including a first bridge diode coupled  
2 between the first clamping device and the rectifier circuit and a second bridge diode  
3 coupled between the second clamping device and the rectifier circuit.
- 1 11. The circuit according to claim 1, further including a positive temperature coefficient  
2 device coupled in parallel with the resonant capacitor.
- 1 12. The circuit according to claim 1, further including an input inductor coupled  
2 between the first input terminal and the series capacitor and a blocking capacitor coupled  
3 in parallel to the input inductor to form a notch filter corresponding to a frequency of the  
4 load signal.
- 1 13. The circuit according to claim 12, further including a first capacitor coupled between  
2 the first and second input terminals.

1 14. The circuit according to claim 1, further including a dimming circuit coupled to the  
2 circuit.

1 15. The circuit according to claim 1, wherein the circuit includes a ballast to energize a  
2 lamp.

1 16. A resonant circuit to energize a load, comprising:

2 a first circuit loop including a first clamping device, a series capacitor, and a first  
3 rectifying diode;

4 a second circuit loop including a second clamping device, and a second rectifying  
5 diode;

6 a third circuit loop including the first clamping device, first and second load  
7 terminals through which load current flows through the load when the load is present, a  
8 resonant inductor, and a first switching device;

9 a fourth circuit loop including the second clamping device, the first and second  
10 load terminals, the resonant inductor, and a second switching device;

11 a resonant capacitor coupled in parallel with the load when the load is present;

12 a first input terminal coupled to the series capacitor; and

13 a second input terminal coupled to the series capacitor,

14 wherein the load current has a signal envelope substantially tracking an input voltage  
15 signal on the first and second input terminals when the load is present and the input  
16 voltage signal is present.

1 17. The circuit according to claim 16, further including a fifth circuit loop including the  
2 second clamping device and a feedback adjusting element.

1 18. The circuit according to claim 16, further including a fifth circuit loop including the  
2 first clamping device and a feedback adjusting element.

1 19. The circuit according to claim 16, further including a fifth circuit loop including the  
2 first and second switching devices and first and second storage capacitors.

1 20. The circuit according to claim 16, further including an input inductor coupled  
2 between the series capacitor and the first input terminal and a blocking capacitor coupled  
3 in parallel with the input inductor such that the input inductor and the blocking capacitor  
4 provide a notch filter at a frequency of the load current.

1 21. The circuit according to claim 16, further including a blocking capacitor and a fifth  
2 circuit loop including an input inductor, the second rectifying diode, a storage capacitor  
3 and a capacitor, wherein the blocking capacitor is coupled in parallel with the input  
4 inductor.

1 22. A resonant circuit, comprising:

2 a first circuit loop including first, second, third and fourth rectifying diodes  
3 coupled to form a full bridge rectifier;

4 a second circuit loop including the third and fourth rectifying diodes and first and  
5 second clamping devices;

6 a third circuit loop including the third rectifying diode, the first clamping device  
7 and a first series capacitor;

8 a fourth circuit loop including the fourth rectifying diode, the second clamping  
9 device and a second series capacitor;

10 a fifth circuit loop including first and second load terminals to energize a load  
11 when present, a resonating inductor, a first switching device, and the first clamping  
12 device;

13 a sixth circuit loop including the first and second load terminals, the resonating  
14 inductor, a second switching device, and the second clamping device; and

15 a first input terminal coupled to a point between the first and second rectifying  
16 diodes and a second input terminal coupled to a point between the third and fourth  
17 rectifying diodes,

18            wherein a load current has a signal envelope that tracks an input voltage signal on  
19 the first and second input terminals.

1    23. The circuit according to claim 22, further including a device coupled across the  
2 second clamping device to adjust a feedback current through the first and second series  
3 capacitors.

1    24. The circuit according to claim 22, further including a device coupled across the first  
2 clamping device to adjust a feedback current through the first and second series  
3 capacitors.

1    25. The circuit according to claim 22, further including a first input inductor coupled  
2 between the first input terminal and the point between the first and second rectifying  
3 diodes and a first capacitor coupled across the first input inductor and a second input  
4 inductor coupled between the second input terminal and the point between the third and  
5 fourth rectifying diodes to provide a notch filter having a frequency corresponding to a  
6 frequency of a load current.

1    26. The circuit according to claim 22, further including a seventh circuit loop including  
2 a storage capacitor, and the first and second switching devices.

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2    27. A resonant circuit, comprising:

3            a first circuit loop including first, second, third and fourth rectifying diodes  
4 coupled to form a full bridge rectifier;

5            a second circuit loop including first and second series capacitors and the third and  
6 fourth rectifying diodes;

7            a third circuit loop including the first series capacitor, a first clamping device, and  
8 a first bridge diode;

9            a fourth circuit loop including the second series capacitor, a second clamping  
10 device and a second bridge diode;

11           a fifth circuit loop including the first clamping device, first and second load  
12 terminals to energize a load when present, a resonant inductor, and a first switching  
13 device;  
14           a sixth circuit loop including the second clamping device, the first and second  
15 load terminals, the resonant inductor and a second switching device;  
16           a first input terminal coupled to a point between the first and second rectifying  
17 diodes and a second input terminal coupled to a point between the third and fourth  
18 rectifying diodes,  
19           wherein a load current has a signal envelope that tracks an input voltage signal on  
20 the first and second input terminals.

1   28. The circuit according to claim 27, further including a device coupled across the  
2 second clamping device to adjust a feedback current through the first and second series  
3 capacitors.

1   29. The circuit according to claim 27, further including a device coupled across the first  
2 clamping device to adjust a feedback current through the first and second series  
3 capacitors.

1   30. The circuit according to claim 27, further including a storage capacitor coupled to  
2 the first and second bridge diodes.

1   31. The circuit according to claim 27, further including a resonant capacitor coupled  
2 across the first and second load terminals.

1   32. A resonant circuit, comprising:  
2           a rectifying circuit to receive an AC input voltage signal;  
3           a feedback path from a load to the rectifying circuit;  
4           a feedback clamping means coupled to the load for providing a load current signal  
5 having a signal envelope that substantially tracks the input voltage signal.

- 1 33. The circuit according to claim 32, further including at least one storage capacitor  
2 coupled to the rectifying circuit.
- 1 34. The circuit according to claim 32, wherein the feedback clamping means includes  
2 first and second clamping diodes.
- 1 35. The circuit according to claim 32, further including a notch filter coupled to the  
2 rectifying circuit wherein the notch filter has a frequency corresponding to a frequency of  
3 the load current signal.
- 1 36. The circuit according to claim 32, further including a series capacitor means coupled  
2 between the feedback clamping means and the rectifying circuit.
- 1 37. A method of generating a linear load in a circuit, comprising:  
2 coupling a feedback signal representative of a load current signal to a rectifying  
3 circuit; and  
4 clamping a voltage of the feedback signal to a predetermined level such that a  
5 load current signal has an envelope that substantially tracks an input AC voltage signal.
- 1 38. The method according to claim 37, further including coupling first and second  
2 clamping devices end-to-end across first and second voltage rails.
- 1 39. The method according to claim 37, further including providing the input AC voltage  
2 signal as a dimming signal.